
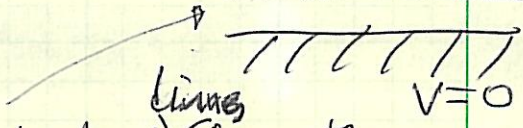


Problem set 6 : JDJ 3;3 and 5 +

- 1) Find a complex transformation that maps the boundary of a 90° corner
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- into the boundary of a 180° corner
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Assuming horizontal equipotentials for the 180° corner, find the equipotential ~~curves~~ curves and the field lines for the 90° corner.

- 2) Using the H_j defined in class
($H_3 = -i \frac{\partial}{\partial \phi}$ etc.)

check that: $[H_k, H_l] = i \epsilon_{klm} H_m$

$$H_1^2 + H_2^2 + H_3^2 = - \left(\frac{1}{\sin^2 \theta} \frac{\partial^2}{\partial \phi^2} + \frac{\partial^2}{\partial \theta^2} \right)$$

Calculate the normalized Y_{3m} using H_+ and H_-

- 3) Using the generating function for Legendre polynomials show that $Y_{20}(\theta, \phi) = \sqrt{\frac{2l+1}{4\pi}} P_l(\cos \theta)$